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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Hiroshi Kawazoe

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LAW OFFICES OF CHARLES GUENZER

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EXAMINER

HSIEH, HSIN YI

ART UNIT

PAPER NUMBER

2811

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/554,136	<b>Applicant(s)</b> KAWAZOE ET AL.	
	<b>Examiner</b> Hsin-Yi (Steven) Hsieh	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9 and 11-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-2, 4-9, and 11-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2008 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20081222, 20090122</u> .                                      | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statements (IDS) submitted on 12/22/2008 and 01/22/2009 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

### ***Drawings***

2. The drawings are objected to because Figs. 1-5 have the shades that make the lines and outlines unclear. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

3. Claims 4-7 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n). The examiner would like to emphasize that "either of claims 1 and 2" can mean "the one and the other of claims 1 and 2", which is not an alternative form.

### ***Double Patenting***

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1 and 2 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, and 28 of copending Application No. 10/505,051. Although the conflicting claims are not identical, they are not patentably distinct from each other because Claims 1 and 2 of the instant application are obvious variants of claims

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1, 4, and 28 of copending Application No. 10/505,051. The limitation of "in a non-barrier junction manner" in the 5th line of claim 1 of the instant application is implied by the limitations "source electrode" and "drain electrode" in claim 1 of copending Application No. 10/505,051, as "source electrode" and "drain electrode" form ohmic contacts to the device (i.e. in a non-barrier junction manner).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. **Claims 11 and 13-15** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 11 recites "the light-emitting layer has a uniform composition across its thickness" in the first two lines of the claim. Claim 13 recites "an ambipolar light-emitting layer uniformly extends from the n-electrode to the p-electrode" in the 4<sup>th</sup> and 5<sup>th</sup> lines of the claim. Both recitations lack the support in the original disclosure. Claims 14-15 are rejected because they depend on the rejected claim 13.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. **Claims 1-2, 4-9 and 11-12** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 1 recites “contact these electrodes in a non-barrier junction manner” in the 5<sup>th</sup> line of the claims. The term “non-barrier junction” is an uncommon term and is not defined in the specification, although some examples of forming non-barrier junction are disclosed. This renders the limitation “contact these electrodes in a non-barrier junction manner” indefinite.

11. Claims 2, 4-9 and 11-12 are rejected because they depend on the rejected claim 1.

### ***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. **Claims 1-2, 7-9 and 11-15** are rejected under 35 U.S.C. 102(b) as being anticipated by Mensz (US 5,422,902 A) as can be understood since claims 1-2, 4-9, and 11-15 have been rejected under 35 U.S.C. 112.

14. Regarding **claim 1**, Mensz teaches a light-emitting diode (laser diode 10; Fig. 5, col. 6 line 28) characterized by comprising: an electron injecting electrode, that is, an n-electrode (n-type waveguide cladding layer 22; Fig. 5, col. 6 line 33); a hole injecting electrode, that is, a p-electrode (p-ZnS<sub>z</sub>Se<sub>1-z</sub> top waveguide cladding layer 30; Fig. 5, col. 6 lines 40-41); and an

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inorganic light-emitting layer (ZnSe 24, active region 26 and p-ZnSe guiding layer 28; Fig. 5, col. 6 lines 35-39) wherein the light-emitting layer (24, 26, and 28) is disposed between the n-electrode (22) and the p-electrode (30) so as to respectively contact the n-electrode and the p-electrode (22 and 30) in a non-barrier junction manner (ohmic contacts, as 22 and 24 are both n-type, and 28 and 30 are both p-type) and (24, 26 and 28) is formed of an ambipolar inorganic semiconductor material (ZnSe or  $\text{Cd}_u\text{Zn}_{1-u}\text{Se}$ , i.e. ZnSe based materials, which is II-VI compound semiconductor materials and is intrinsically an ambipolar inorganic semiconductor material) and has a thickness in a range of 10 nm or more and 10  $\mu\text{m}$  or less (about 1 - 2.5  $\mu\text{m}$ ; col. 7 lines 1-6), wherein the ambipolar inorganic semiconductor material (24, 26, 28) is selected from the group consisting of (a) a group II-VI compound and (b) Zn and at least one element selected from the group consisting of S, Se and Te (i.e. ZnSe).

15. Regarding **claim 2**, Mensz also teaches a the light-emitting diode according to claim 1, characterized in that the ambipolar inorganic semiconductor material has a dopant concentration of 0.1% or less in atomic ratio ( $2 \times 10^{17} \text{ cm}^{-3}$  for 24 and 30 which is less than  $10^{-5}$  in atomic ratio; col. 6 lines 53-55).

16. Regarding **claim 7**, Mensz also teaches the light-emitting diode according to either of claims 1 and 2, characterized in that a material (the material of 22) of a portion contacting the light-emitting layer (24, 26 and 28) in at least one of the n-electrode (22) and the p-electrode (30) is formed by use of a material ( $\text{ZnS}_x\text{Se}_{1-x}$ ) substantially different from the material of the light-emitting layer (ZnSe of 24 and 28)

17. Regarding **claim 8**, Mensz also teaches the light-emitting diode according to either of claims 1 and 2, characterized in that the ambipolar inorganic semiconductor material (24, 26, 28)

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is formed on a crystalline substrate or a glass substrate (GaAs substrate 20, which is crystalline as its lattice constant is mentioned; Fig. 5, col. 6 lines 29,13), and the n-electrode (22) and the p-electrode (30) are formed on opposing sides of the ambipolar inorganic semiconductor material (24, 26, 28; 22 and 30 form on the opposite sides of 24, 26, and 28) wherein the n-electrode and the p-electrode do not contact each other (22 not contacting 30; see Fig. 5).

18. Regarding **claim 9**, Mensz also teaches the light-emitting diode according to either of claims 1 and 2, characterized in that a first one of the n-electrode (22) and the p-electrode (30) is formed on a crystalline substrate or a glass substrate (GaAs substrate 20, which is crystalline as its lattice constant is mentioned; Fig. 5, col. 6 lines 29,13), and the ambipolar inorganic semiconductor material (24, 26, and 28) is stacked thereon (24, 26, 28 is stacked on 20), and a second one of the p-electrode (30) and the n-electrode (22) is stacked thereon (30 and 22 are stacked on 20).

19. Regarding **claim 11**, Mensz also teaches the light emitting diode according to claim 1, wherein the light-emitting layer (24, 26, 28) has a uniform composition across its thickness (piecewise uniform with either ZnSe or  $\text{Cd}_u\text{Zn}_{1-u}\text{Se}$ , which is considered uniform; col. 6 lines 19-50) .

20. Regarding **claim 12**, Mensz also teaches the light emitting diode according to claim 1, wherein only one such light-emitting layer (24, 26, and 28, which can be considered as one light-emitting layer) is formed between the p-electrode (30) and the n-electrode (22).

21. Regarding **claim 13**, Mensz also teaches a light-emitting diode (laser diode 10; Fig. 5, col. 6 line 28), comprising: an electron injecting n-electrode (n-type waveguide cladding layer 22; Fig. 5, col. 6 line 33); a hole injecting p-electrode (p- $\text{ZnS}_z\text{Se}_{1-z}$  top waveguide cladding layer



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30; Fig. 5, col. 6 lines 40-41); an ambipolar light-emitting layer (ZnSe 24, active region 26 and p-ZnSe guiding layer 28; Fig. 5, col. 6 lines 35-39) uniformly extending (piecewise uniformly extending with either ZnSe or  $\text{Cd}_x\text{Zn}_{1-x}\text{Se}$ , which is considered uniformly extending; col. 6 lines 19-50) from the n-electrode (22) to the p- electrode (30; see Fig. 5), having a thickness in a range of greater than 10 nm and no more than 100 nm (about 1 - 2.5  $\mu\text{m}$ ; col. 7 lines 1-6), and comprising one ambipolar semiconductor material (ZnSe-based material; col. 2 lines 6-9) selected from the group consisting of (a) a group II-VI compound and (b) Zn and at least one element selected from the group consisting of S, Se and Te (i.e. ZnSe).

22. Regarding **claim 14**, Mensz also teaches the light-emitting diode of claim 13, wherein the ambipolar light-emitting layer (24, 26, 28) consists of the one ambipolar semiconductor material (ZnSe-based material; col. 2 lines 6-9).

23. Regarding **claim 15**, Mensz also teaches the light-emitting diode of claim 13, wherein the one ambipolar semiconductor material (ZnSe-based material; col. 2 lines 6-9) is Zn and at least one element selected from the group consisting of S, Se and Te (i.e. ZnSe).

### ***Claim Rejections - 35 USC § 103***

24. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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25. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

26. **Claims 4-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mensz as applied to claims 1-2 above as can be understood since claims 1-2, 4-9, and 11-15 have been rejected under 35 U.S.C. 112.

27. Regarding **claim 4**, Mensz also teaches the light-emitting diode according to either of claims 1 and 2, characterized in that the n-electrode (22) includes a layer (22) formed by use of an n-type inorganic semiconductor material (n-type  $\text{ZnS}_x\text{Se}_{1-x}$ ; col. 6 lines 33-34) in which an n-type dopant is diffused into the ambipolar inorganic semiconductor material (this limitation is considered as the method of forming device, and the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight).

28. Regarding **claim 5**, Mensz also teaches the light-emitting diode according to any either of claims 1 and 2, characterized in that the p-electrode (30) includes a layer (30) formed by use of a p-type inorganic semiconductor material (p-type  $\text{ZnS}_z\text{Se}_{1-z}$ ; col. 6 lines 40-41) in which a p-type dopant is diffused into the ambipolar inorganic semiconductor material (this limitation is considered as the method of forming device, and the method of forming a device is not germane

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to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight).

29. Regarding **claim 6**, Mensz also teaches the light-emitting diode according to either of claims 1 and 2, characterized in that the n-electrode (22) includes a layer (22) formed by use of an n-type inorganic semiconductor material (n-type  $\text{ZnS}_x\text{Se}_{1-x}$ ; col. 6 lines 33-34) in which an n-type dopant is diffused into the ambipolar inorganic semiconductor material (this limitation is considered as the method of forming device, and the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight), and the p-electrode (30) includes a layer (30) formed by use of a p-type inorganic semiconductor material (p-type  $\text{ZnS}_z\text{Se}_{1-z}$ ; col. 6 lines 40-41) in which a p-type dopant is diffused into the ambipolar inorganic semiconductor material (this limitation is considered as the method of forming device, and the method of forming a device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight).

### ***Response to Arguments***

30. Applicant's amendments, filed 12/22/2008, overcome the objections to claims 1-10. The objections to claims 1-10 have been withdrawn. The objections to the drawings still stand because the issues are not fully corrected.

31. On page 6 of Applicant's Response, regarding to double patenting rejection to claims 1 and 2, Applicant argues that the present application relates to a light-emitting diode while 10/505,051 relates to a field-effect transistor. Although both are light-emitting elements, the present diode differs from the field-effect transistor of the copending application in structure and

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operation and one is not obvious over the other. The Examiner respectfully disagrees with Applicant's argument, because the limitations in claims 1 and 2 of the instant application are obvious variants of the limitations of claims 1, 4, and 28 of copending Application No.

10/505,051. The double patenting rejection to claims 1 and 2 still stands.

32. The Applicant's amendments, filed 12/22/2008, overcome partially the rejections to claims 1-10 under 35 U.S.C. 112. On pages 6-7 of Applicant's Response, Applicant argues that the term "non-barrier junction" is adequately defined by Applicants in their filed application at [0107] of US 2006/0261350. The Examiner respectfully disagrees with Applicant's argument, because [0107] of US 2006/0261350 only describes an example of barrier formation and fails to define the term "non-barrier junction". The barrier formation depends on a lot of factors: materials (metal to metal, metal to semiconductor, or semiconductor to semiconductor), carrier type (electrons or holes), and interface states. The paragraph [0107] of US 2006/0261350 does not disclose any of the above factors except the work function of n-electrode and p-electrode and the semiconductor. The work function is only used in determining the barrier of metal to semiconductor interface, which is reason why the Examiner said that the paragraph [0107] only disclose an example of barrier formation. It is also because of that there are many factors in the barrier formation that the term "non-barrier junction" has to be defined clearly to ensure the scope of the subject matters are clear. The paragraph [0107] of US 2006/0261350 fails to define the "non-barrier junction" and also has some flaws, e.g. the mixing-up of the valance band with the valance band, no disclosure of the type of the semiconductor (p-type or n-type) which is important in forming the barrier, no disclosure whether p-electrode or n-electrode is a metal

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which is important in using the concept of the work function, and etc. Thus the rejection related to the term "non-barrier junction" still stands.

33. On pages 7-8 of Applicant's Response, Applicant argues that Mensz does not teach the claimed minimum thickness of 10 nm of the light-emitting layer, because the cladding layer 30 and contact layer 16 are not the light emitting layers.

34. The Examiner respectfully disagrees with Applicant's argument, because the light emitting layer are typically have a multilayer structure and do not need to emit the light everywhere in the layer. "light emitting" is a functional limitation to the element of "light emitting layer" and any layer that can emit the light can be a light-emitting layer. For example, with the same concept, "light emitting device" is a device that can emit the light and still has some parts in the device, e.g. electrodes, that do not emit the light.

35. On page 8 of Applicant's Response, Applicant argues that the examiner identifies the claimed non-barrier contact with Mensz's ohmic contact. This identification is incorrect. First of all, Mensz's ohmic contact layer 16 does not contact an ambipolar light emitting layer; it contacts his p-type Zn(S,Se) waveguide layer 30, which is neither ambipolar nor light emitting. Further the non-barrier interface of the claims differs from Mensz's ohmic contact layer 16 of BeTe/ZnSe and ZnSe providing a ohmic contact to his p- Zn(SSe) cladding layer 30 (col. 5, line 5). As is clear from Mensz's FIG. 2 with its Fermi level  $E_F$  closely adjacent its valence band  $E_v$ , Mensz's ohmic contact layer 16 is p-type, similarly to his adjacent p-Zn(SSe) cladding layer such that Mensz's interface is a p-p junction. An ohmic contact could similarly be formed of an n-n junction although Mensz does not disclose an n-n ohmic contact. In contrast, the claimed contacts between the light-emitting layer and the n- electrode or p-electrode are between n-type

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and ambipolar and between p-type and ambipolar. The claimed structure cannot be interpreted as producing both an n-n ohmic contact, not disclosed by Mensz, and the p-p ohmic contact of Mensz.

36. The Examiner respectfully disagrees with Applicant's argument, because the Examiner identifies the ohmic contact as the contact between 22 and 24 and the contact between 28 and 30), and not the Mensz's ohmic contact layer 16.

37. On pages 8-9 of Applicant's Response, Applicant argues that Mensz's light emitting quantum wells barriers are not disclosed to be ambipolar.

38. The Examiner respectfully disagrees with Applicant's argument, because Mensz's light emitting quantum wells barriers are ambipolar. According to the definition in the specification of the instant application, an ambipolar material is a material cable to transport both electrons and holes. Mensz's light emitting quantum wells barriers are ZnSe or  $\text{Cd}_u\text{Zn}_{1-u}\text{Se}$ , which are II-VI compound semiconductors. Semiconductors are ambipolar materials for they can transport both electrons and holes, although some semiconductors have the majority carriers of one of the electrons and holes. Thus according to the definition of the instant application, Mensz's light emitting quantum wells barriers are ambipolar.

39. On page 9 of instant application, Applicant argues that these claims require not only that the electrode layer be formed of n- or p-type materials, as the examiner identifies to Mensz's cladding layers 22 and 30, but that the dopants therein diffuse into the ambipolar inorganic semiconducting material. Mensz's spacer layers within his quantum well active region impede the diffusion of dopants from the electrodes into his undoped region, which the examiner incorrectly identifies as ambipolar. The lack of a barrier recited in claim 1, on the other hand,

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permits the ready diffusion of dopants across the contact between the electrode and the ambipolar semiconductor layer.

40. The Examiner respectfully disagrees with Applicant's argument, because the dopants therein diffuse into the ambipolar inorganic semiconducting material is a process limitation which do not have a patentable weight in product claims.

### ***Conclusion***

41. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsin-Yi (Steven) Hsieh whose telephone number is 571-270-3043. The examiner can normally be reached on Monday to Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on 571-272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lynne A. Gurley/  
Supervisory Patent Examiner, Art Unit  
2811

/H. H./  
Examiner, Art Unit 2811  
3/28/2009